Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Wireless E911 Location Accuracy Requirements	)	PS Docket No. 07-114
	)	
	)	

To: The Commission

COMMENTS OF
THE BOULDER REGIONAL EMERGENCY TELEPHONE SERVICE AUTHORITY ON VERTICAL (Z-AXIS) ACCURACY METRIC PROPOSED BY THE NATIONWIDE WIRELESS CARRIERS

The Boulder Emergency Telephone Service Authority ("BRETSA"),[1] by its attorney, hereby submits it's Comments on the vertical accuracy (z-axis) test bed report ("Report"),[2] submitted by CTIA on behalf of the nationwide wireless carriers (the "Carriers"),[3] and on the Carrier's proposed z-axis accuracy metric of +/- 5 meters submitted with the Report.[4]

I. Stakeholder Interests.

It is to the Carriers' advantage to have the Commission adopt a less-precise accuracy metric with which it will be easier to comply. BRETSA understands the Carriers are also concerned the adoption of an accuracy metric could give rise to a *de facto* monopoly if only one Location Provider can meet the metric.

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[1] BRETSA is a Colorado 9-1-1 Authority which establishes, collects and distributes the Colorado Emergency Telephone Surcharge to fund 9-1-1 Service in Boulder County, Colorado. The BRETSA Board includes the Boulder County Sheriff, the City of Boulder Police Chief, representatives of the Boulder County Firefighters Association and the City of Longmont Division of Public Safety. The fifth seat of the Board is filled by representatives of the smaller cities and towns in Boulder County, Colorado on a rotating basis. These Comments are thus intended to represent the perspective of the entity responsible for funding 9-1-1 operations, *and* of the agencies and authorities responsible for PSAP operations and overall public safety services.

[2] 9-1-1 Location Technologies Test Bed, LLC, Report on Stage Z, https://www.fcc.gov/ecfs/filing/10803074728956.

[3] AT&T Mobility, Sprint, T-Mobile USA, and Verizon

[4] Letter from Scott K. Bergmann, Senior Vice President of Regulatory Affairs, CTIA, et al., to Marlene H. Dortch, Secretary, FCC (Aug. 3, 2018), https://www.fcc.gov/ecfs/filing/10803074728956.

The Location Providers may have an incentive to overstate the accuracy of their z-axis location technology, to gain approval of their system and monetize their technology.

It is because of these conflicting interests that demonstration of the capabilities of Location Providers' technologies in a common, objectively administered test-bed ("Test-Bed") is necessary. However, as BRETSA has previously observed, the Test-Bed can only demonstrate that a particular location technology *is capable* of meeting a given metric. It does not establish that the technology will meet the metric in other environments, particularly where performance is dependent upon in-market deployment of infrastructure by the Location Provider.[5]

II. Use of Vertical Location Data.

There are three points in the 9-1-1 Call—Emergency Response process in which the provision of caller location is critical.

Most critical is the provision of caller location information for purposes of routing the call to the PSAP which has the authority and the radio frequencies to dispatch First Responders to the caller's location. This is the most critical caller location information because the call cannot be processed and First Responders dispatched (if necessary) until the call is received at the correct PSAP. It is also the most critical caller location information because, in BRETSA's experience, more incidents are impacted by misrouting of 9-1-1 calls to an incorrect PSAP than by callers who are unable to provide their location to the dispatcher once the call reaches the correct PSAP.

[5] A Location Provider may make uneconomic investments in location technology infrastructure in the Test-Bed environment, but invest less in infrastructure in other deployments absent proof-of-performance testing. NextNav relies on deployment of infrastructure to achieve two-meter accuracy. Polaris has stated that it did not utilize "in-market barometric sensor bias compensation which proved to be a major disparity in performance affecting the test results." Letter from James Arden Barnett, Jr., Counsel to Polaris, to Marlene H. Dortch, Secretary, FCC (Sept. 10, 2018) at 2, https://www.fcc.gov/ecfs/filing/10910939013527. BRETSA does not know the extent to which Polaris must deploy in-market infrastructure to provide barometric sensor bias compensation. BRETSA also understands that it has not yet been demonstrated that Polaris can meet the two-meter accuracy metric in the objective Test-Bed.

The second point at which the provision of the caller's location is critical is when the call reaches the correct PSAP, and the PSAP requires the location to which First Responders should be dispatched.[6] Dispatchers *initially* "rebid" for more accurate Phase II caller location information, and ask the caller their location in order to confirm that the call has reached the correct PSAP. Once the dispatcher is confident that the call has reached the correct PSAP, the dispatcher interviews the caller further to determine and verify whether First Responders need to be dispatched, and if so, the complement of First Responder units to dispatch and the location to which First Responders are to be dispatched. Phase II call information is often available to the PSAP by the time First Responders are dispatched, although the caller will often provide a more precise location than the Phase II location data.

The third point at which the provision of location information can be critical is when the First Responders have reached the location to which they have been dispatched. If the location of the caller or incident is in the interior of a structure, for example, additional location information may be required to reduce the scope of the search and the time required to search for the caller and incident. Such additional location information is not required until the First Responders exit their vehicle(s) at the location to which they have been dispatched.

Z-axis information falls into this third category of critical location information. Z-axis information is not necessary to dispatch First Responders to the address of a multi-floor building from which a 9-1-1 call has been placed. It generally takes a matter of minutes for the dispatcher to interview the caller, determine that dispatch of First Responders is required and the location to which First Responders are to be dispatched, *and for the First Responders to reach the location of the incident*. While First Responders are en route to the caller's location, additional time is provided for the Location Provider to improve the resolution of the caller's x, y and z axis

[6] Not all 9-1-1 calls result in the dispatch of First Responders.

location, and for the dispatcher to gather additional information from the caller. In the case of incidents in multi-story buildings, elevation information can narrow the number of floors First Responders must search for the caller or subject.

It is axiomatic that even if three- or four-meter accuracy rather than two-meter accuracy is provided; the time required for a given number of responders to locate a caller or subject on one, two or three floors based upon z-axis information will be much less than the time required to search ten, forty, or 100 or more floors of a building.

III. A Z-axis Accuracy Metric of Two-Meters for Eighty Percent of Calls Should Be Adopted.

NextNav has demonstrated in the Test-Bed that it can reliably achieve z-axis accuracy of +/- 2-meters for 80 percent of calls ("two-meter accuracy").[7]

A. Proof-of-Performance.

NextNav must deploy infrastructure in the markets in which it holds certain radiofrequency licenses to achieve provide its x, y and z location services. Its technology infrastructure may not yet be deployed, or deployed to a sufficient extent to achieve this level of accuracy, in all relevant markets. BRETSA understands that NextNav does not hold licenses to the frequencies required by its system in *all* markets, and not all markets will be characterized by large multi-story buildings with a need for z-axis information. (A deployment schedule agreed to by the Carriers and Location Provider(s) should be filed with the Commission and approved, if reasonable). It may take time for NextNav to deploy and optimize its infrastructure to provide two-meter accuracy in each market in which it holds the required radiofrequency licenses.

[7] BRETSA understands that the NextNav system can also benefit the public by more expeditiously providing more accurate caller x,y location information, including for purposes of 9-1-1 call-routing.

The two-meter accuracy metric should thus apply only in markets in which a Location Provider's infrastructure has been deployed and a proof-of-performance completed showing that the technology is capable of meeting that level of accuracy. If modification of the infrastructure is required to achieve two-meter accuracy, Carriers should (i) only be required to comply with the actual level of accuracy achieved in proof-of-performance testing until the Location Provider is able to meet the two-meter accuracy requirement, and (ii) advise affected PSAPs of the actual level of accuracy provided so that First Responder operating procedures can be adjusted as appropriate. A time-limit for compliance with the two-meter standard should be adopted.

There may be markets where Location Providers will be unable to deploy their location technology (due to a lack of radiofrequency licenses, for example), or the number of multi-story buildings, population and related characteristics of a market are such that deployment of a location technology is unnecessary or uneconomic. PSAPs serving suburban or rural areas adjacent to densely urbanized areas, and located outside of the area in which location technology is deployed, may nevertheless receive z-axis data which is less accurate than that provided within the densely urbanized area, and which First Responders find useful. The metric applicable to the areas served by these PSAPs should be that actually achieved in proof-of-performance testing, without penalty, unless a PSAP is able to demonstrate a need for more accurate data justifying the investment in deployment of additional location infrastructure.

B. PSAP Testing of Vertical Location Accuracy.

The Carriers and Location Providers should be required to publish procedures for PSAPs or other public safety entities to test vertical location accuracy within the PSAP's or entity's jurisdiction, or even with respect to specific buildings within such jurisdictions as part of preparation of Emergency Response pre-plans. These published procedures should include a

description of any actions or cooperation required of the Carrier and Location Provider to complete the tests, the manner in such action or cooperation is to be requested, and the commitment of the Carrier and Location Provider to take such action or provide such cooperation.

C. Waivers.

A Location Provider and the Carriers should be granted a waiver in any instance in which the Location Provider is unable to achieve two-meter z-axis location accuracy within a market area (densely urbanized area) after reasonable effort and investment. The grant of such waiver(s) should be considered in assessing whether the Location Provider should remain on the list of Location Providers which have demonstrated in the Test-Bed that they are capable of meeting the two-meter accuracy metric. Where a Location Provider and Carriers have been granted a waiver, the required accuracy should be that demonstrated through proof-of-performance in the market.

There may be disputes over waivers between Carriers, which may want to limit the cost of providing z-axis information; and Location Providers which may believe they can meet the two-meter standard with placement and tweaking of additional infrastructure, and do not want to be delisted as capable of meeting the two-meter metric. The Commission should mediate or arbitrate these disputes.

IV. Cost of Vertical Location Technology.

BRETSA does not believe deployment of life-saving technologies should be delayed due to potential squabbles over the cost of vertical location technologies. BRETSA also realizes that establishment of an accuracy metric which only a single provider can achieve could create a *de facto* monopoly, of obvious concern to the Carriers. If the adoption of a two-meter accuracy

metric would result in the establishment of a *de facto* monopoly for a single Location Provider capable of meeting the metric, there are ways for the Commission to address this concern without delaying deployment of the technology. That is, the Commission could mediate or arbitrate any dispute as to the charges established by the Location Provider for provision of vertical location information meeting the accuracy metric. The Commission could require the monopoly provider to tariff cost-based rates for the service of providing vertical location data. Alternatively, the Commission could condition the requirement that Carriers' comply with the vertical location accuracy metric on the cost-of-compliance not exceeding a stated amount (providing the Location Provider a reasonable return on its investment), established through cost-studies conducted by the Commission. There are certainly other methods the Commission could employ to assure that charges to the carriers for vertical location information meeting the accuracy metric does not exceed the efficient cost of providing the service plus a reasonable rate of return, in a monopoly environment.

V. Concerns with Dispatchable Locations.

BRETSA continues to be concerned with the provision of "Dispatchable Locations" to PSAPs. As BRETSA understands it, Dispatchable Locations will be determined in the main by proximity of a smartphone to WiFi Access Points ("APs") and/or Bluetooth Beacons ("Beacons"), the location of which have themselves been estimated through various means possibly including crowdsourcing.[8] Given the nature of radio frequency transmissions and potential placement or location of APs, Beacons or smartphones in a premises, the signals may actually be stronger in adjacent premises or exterior locations than at some interior locations. APs and Beacons may be relocated or replaced. Dispatchable Locations would thus appear to

[8] This proximity-location system is different than GPS, or the NextNav x,y location determination system, which allow a smartphone to determine the geographic coordinates at which it is located. GPS and NextNav rely on a GPS chipset to determine the distance of the smartphone from known reference coordinates (transmitter locations).

risk dispatching First Responders to incorrect addresses or units, similar to "Swatting" which can have deadly consequences. Section 20.18(i)(i) of the Commission's Rules, 47 C.F.R. 20.18(i)(i), requires that the Dispatchable Location must be validated, although it is not clear how such validation will be provided.

BRETSA believes that wireless caller locations are best provided to a PSAP as geographic coordinates, with confidence and uncertainty data, so that (i) the uncertainty and potential error in the plotting of the caller's actual location is clear to the PSAP and First Responders, and (ii) the PSAP (dispatcher) can estimate the location of the caller using the x,y plot, CAD incident records and premises information, as well as "local knowledge" regarding callers, individuals or locations previously or frequently involved in incidents.

Respectfully submitted,

BOULDER REGIONAL EMERGENCY TELEPHONE SERVICE AUTHORITY

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October 1, 2018